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IS 8805-1 (1978): General requirements for ferrule type couplings used in oil-hydraulic system, Part 1: General [PGD 17: Fluid Power Fittings, Hoses and Hose Assemblies]

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*Indian Standard*GENERAL REQUIREMENTS FOR FERRULE
TYPE COUPLINGS USED IN OIL-HYDRAULIC SYSTEMS

PART I GENERAL

(Incorporating Amendment Nos. 1, 2 & 3)

1. Scope — Specifies the requirements for ferrule type couplings for tube with outside diameter of tube from 4 mm to 42 mm used in oil-hydraulic systems.

2. Working Principles — A coupling body, a coupling nut and a ferrule when assembled with a tube forms a joint. After the alignment of the body, nut and ferrule with the tube, the nut is progressively tightened causing the ferrule to move along with the nut. On tightening, the force exerted uniformly makes the ferrule to bite onto the tube. Thus the ferrule is made to throw up in front of it a ridge of displaced metal, which acts as a metallic interlock and gives the joint the pressure holding quality (see Fig. 1 and 2).

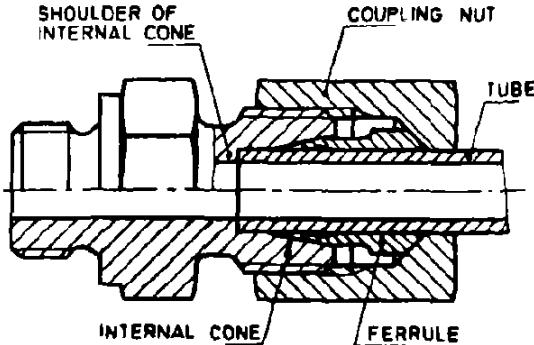


FIG. 1 BEFORE TIGHTENING OF COUPLING NUT

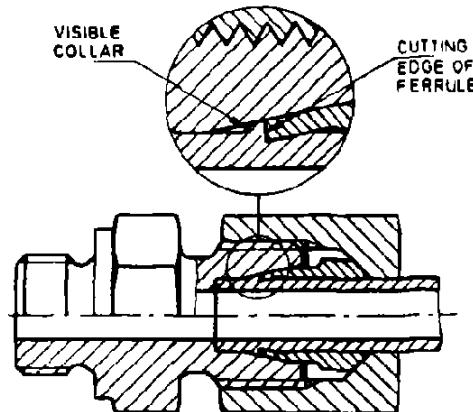


FIG. 2 AFTER TIGHTENING OF COUPLING NUT

2.1 On making of the joint, the ferrule is altered in shape and its leading edge becomes embedded in the tube. When the joint is broken the ferrule remains permanently attached to the tube end, and because of this, the joint can be dismantled and remade without affecting sealing characteristics for a number of times. In addition to acting as a sealing member the ferrule also functions as a spring washer between the nut, the body portion and the surface of the tube which helps the joint to remain pressure tight even during heavy vibrations.

3. Tube Sizes — Tubes having the outside diameter and tolerances specified in Table 1 and suitable to withstand the desired pressure shall be chosen.

TABLE 1 TOLERANCES ON TUBE SIZES (All dimensions in millimetres)	
Outside Diameter of Tube	Tolerance
4	
6	
8	
10	
12	
14	
15	
16	± 0.1
18	
20	
22	
25	
28	
30	
35	± 0.15
38	
42	± 0.2

Adopted 14 February 1978

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IS : 8805 (Part I) - 1978

4. Working Pressure — The minimum working pressures for couplings used at temperatures between -10°C and $+120^{\circ}\text{C}$ shall be as given in Table 2. For applications involving other working temperatures, the working pressures shall be subject to agreement between the purchaser and the manufacturer.

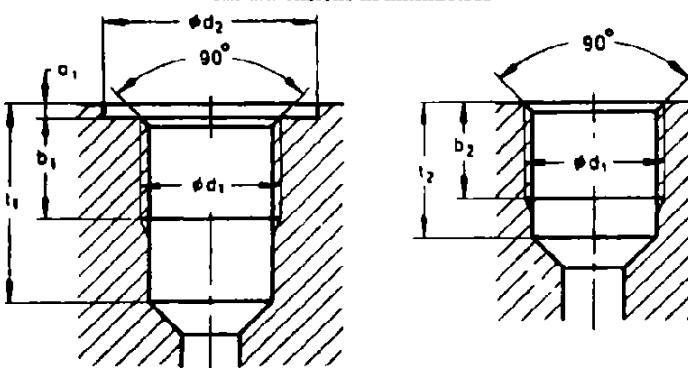
TABLE 2 GENERAL OUTLAY OF PRESSURE RANGES, TUBE SIZES AND THREADS

Series	Outside Dia of Tube mm	Nominal Bore of Tube mm	Working Pressure MN/m ² (kgf/cm ²)	Thread Size at Port/Stud End (Pipe Threads)
Light L	4	3	3.9 (40) 24.5 (250) 15.7 (160) 9.8 (100)	1/8
	6	5		1/8
	8	6		1/4
	10	8		1/4
	12	10		3/8
	15	12		1/2
	18	16		1/2
	22	20		3/4
	28	25		1
	35	32		1 1/4
Heavy H	42	40		1 1/2
	6	3	39.2 (400) 24.5 (250)	1/4
	8	4		1/4
	10	6		3/8
	12	8		3/8
	14	10		1/2
	16	12		1/2
	20	16		3/4
	25	20		1
	30	25		1 1/4
	38	32		1 1/2

5. Port Details — The types and details of threads for ports shall be as given in Table 3.

TABLE 3 DIMENSIONS AND TYPES OF THREADS FOR PORTS

All dimensions in millimetres



PORT END FORM X
(FOR STUD ENDS OF TYPES A, B AND C1)

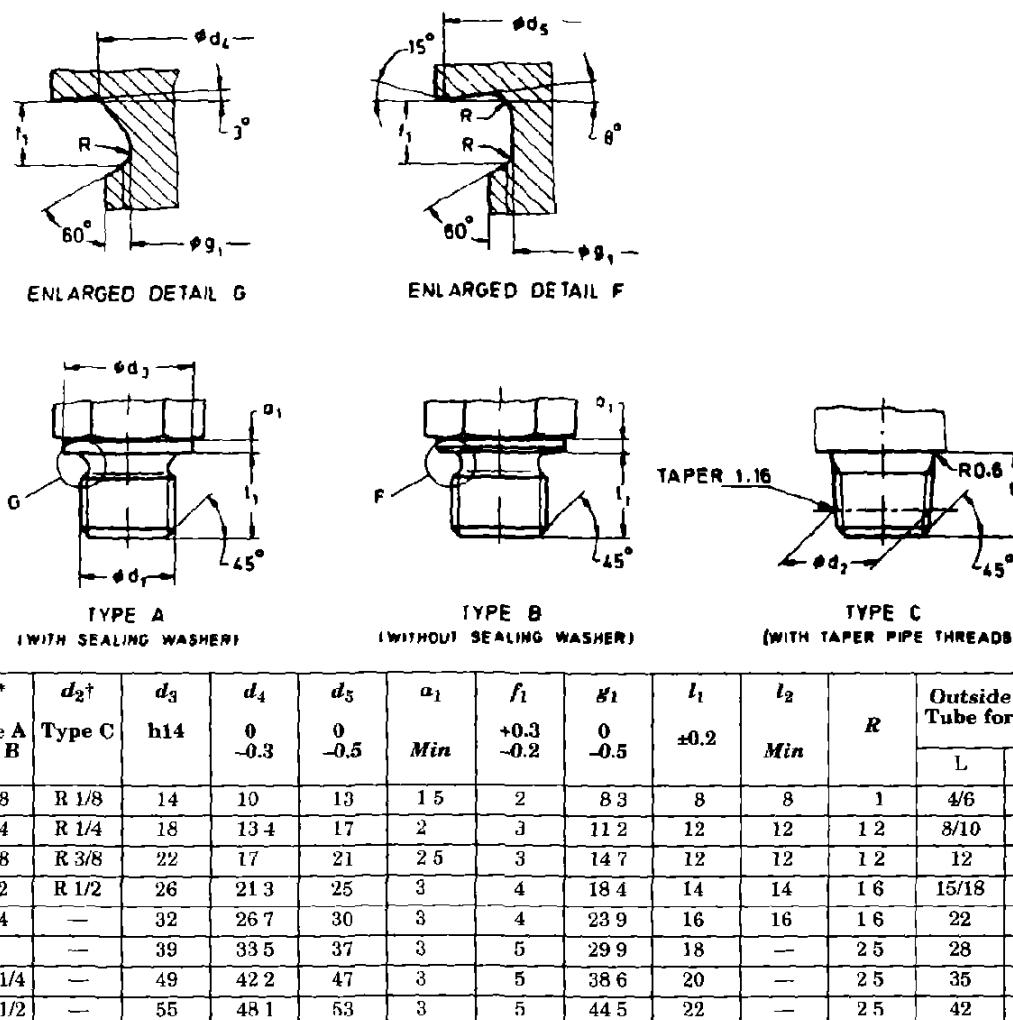
PORT END FORM Y
(FOR STUD END OF TYPE C1)

d_1	$d_2 + 0.4$ 0	$a_1 \text{ Max}$	b_1	b_2	$t_1 \text{ Min}$	$t_2 \text{ Min}$
G 1/8	15	1	8	5.5	13	9.5
G 1/4	19	1.5	12	8.5	18.5	13.5
G 3/8	23	2	12	8.5	18.5	13.5
G 1/2	27	2.5	14	10.5	22	16.5
G 3/4	33	2.5	16	13	24	19
G1	40	2.5	18	—	27	—
G1 1/4	50	2.5	20	—	29	—
G1 1/2	56	2.5	22	—	31	—

Note — The internal threads shall be parallel pipe threads according to IS . 2643-1975 'Dimensions for pipe threads for fastening purposes' The threads shall not be truncated

6. Details of Stud End for Couplings — The types and details of stud end for couplings shall be as given in Table 4.

TABLE 4 DIMENSIONS AND TYPES OF STUD ENDS FOR COUPLINGS
All dimensions in millimetres



d_1^*	$d_2^†$	d_3	d_4	d_5	a_1	f_1	g_1	l_1	l_2	R	Outside Dia of Tube for Series	
											L	H
Type A and B	Type C	$h14$	0 -0.3	0 -0.5	Min	+0.3 -0.2	0 -0.5	±0.2	Min			
G 1/8	R 1/8	14	10	13	1.5	2	8.3	8	8	1	4/6	—
G 1/4	R 1/4	18	13.4	17	2	3	11.2	12	12	1.2	8/10	6/8
G 3/8	R 3/8	22	17	21	2.5	3	14.7	12	12	1.2	12	10/12
G 1/2	R 1/2	26	21.3	25	3	4	18.4	14	14	1.6	15/18	14/16
G 3/4	—	32	26.7	30	3	4	23.9	16	16	1.6	22	20
G 1	—	39	33.5	37	3	5	29.9	18	—	2.5	28	25
G 1 1/4	—	49	42.2	47	3	5	38.6	20	—	2.5	35	30
G 1 1/2	—	55	48.1	53	3	5	44.5	22	—	2.5	42	38

*The threads on Type A and B shall be external pipe threads of tolerance class A of IS 2643-1975

†The threads on Type C shall be external taper pipe threads to IS 554-1975 'Dimensions for pipe threads where pressure tight joints are required on the threads (second revision)'

7. Details of Tube End for Couplings — The details of tube end for couplings shall be as given in Table 5.

8. General Requirements

8.1 Workmanship — Coupling shall be cleanly and neatly finished, free from burrs, fins, sharp edges and other defects.

8.2 Surface Protection — As specified in individual standards.

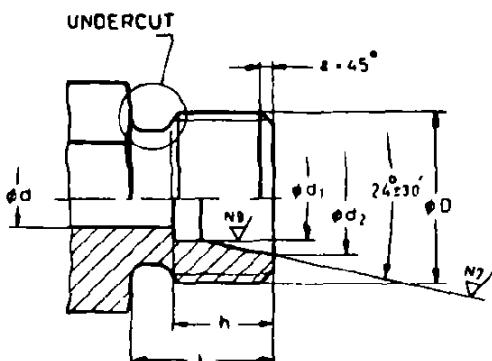
8.3 Marking — Each coupling shall be clearly marked with size (outside dia of tube) and series (letter L or H).

8.3.1 ISI Certification Marking — Details available with the Indian Standards Institution.

TABLE 5 DIMENSIONS OF TUBE END FOR COUPLINGS

(Clause 7)

All dimensions in millimetres



Series	Outside Dia of Tube	D	d	d_1 B 11	d_2 $+0.1$ 0	l ± 0.2	h $+0.3$ 0
Light L	4	M 8 x 1	3	4	5	8	4
	6	M 12 x 1.5	4	6	8.1	10	7
	8	M 14 x 1.5	6	8	10.1	10	7
	10	M 16 x 1.5	8	10	12.3	11	7
	12	M 18 x 1.5	10	12	14.3	11	7
	15	M 22 x 1.5	12	15	17.3	12	7
	18	M 26 x 1.5	15	18	20.3	12	7.5
	22	M 30 x 2	19	22	24.3	14	7.5
	28	M 36 x 2	24	28	30.3	14	7.5
	35	M 45 x 2	30	35	38	16	10.5
Heavy H	42	M 52 x 2	36	42	45	16	11
	6	M 14 x 1.5	4	6	8.1	12	7
	8	M 16 x 1.5	5	8	10.1	12	7
	10	M 18 x 1.5	7	10	12.3	12	7.5
	12	M 20 x 1.5	8	12	14.3	12	7.5
	14	M 22 x 1.5	10	14	16.3	14	8
	16	M 24 x 1.5	12	16	18.3	14	8.5
	20	M 30 x 2	16	20	22.9	16	10.5
	25	M 36 x 2	20	25	27.9	18	12
	30	M 42 x 2	25	30	33	20	13.5
	38	M 52 x 2	32	38	41	22	16

Note 1 — For undercut details refer IS 1369-1975 'Dimensions of screw thread runouts and undercuts'

Note 2 — For values of chamfer Z refer IS 1368-1967 'Dimensions of ends of bolts and screws'

Note 3 — Threads for dia D shall conform to class 6g of IS 4218 (Part IV)-1976 ISO metric screw threads Part IV Tolerancing system (first revision)

9. Test Requirements

9.1 Hydraulic Test Requirements of Assembled Joint — When agreed between the purchaser and the manufacturer, a coupling, selected to represent a batch of couplings, shall be assembled as a joint and subjected to an internal pressure at least $1\frac{1}{2}$ times the working pressure of the system. The tubing used for the assembled joint shall be representative of that to be installed with the couplings. The test fluid, test pressure, method and duration of test shall be agreed between the purchaser and the manufacturer.

9.1.1 When so tested, the assembled joint shall show no sign of leakage.

9.2 Dismantling and Re-assembly — The coupling shall be capable of having the joint dismantled and remade six times and shall provide a sound joint on each occasion and shall, on each re-assembly, be tested as specified in 9.1.

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E X P L A N A T O R Y N O T E

This standard would be finally prepared in three parts The other parts of the standard are:

Part II Survey of coupling assemblies and assembly procedure

Part III Test requirements

In the preparation of this part of the standard, considerable assistance has been derived from the following:

BS 4368 Part 1 Carbon and stainless steel compression couplings, heavy series (metric),

BS 4368 · Part 3 Carbon and stainless steel compression couplings, light series (metric);

DIN 2353 — Non soldered, taper bush type unions, complete unions and survey; and

DIN 3852 Blatt 2 — Screwed plugs, tapped holes, with whitworth pipe threads, general outlay of types

This edition 1.3 incorporates Amendment No 1 (April 1981), Amendment No. 2 (April 1985) and Amendment No 3 (June 1995) Side bar indicates modification of the text as the result of incorporation of the amendments